to make tools and/or methods commercially available so that crash investigators and researchers are able to retrieve data from EDRs.

§ 563.2 Purpose.

The purpose of this part is to help ensure that EDRs record, in a readily usable manner, data valuable for effective crash investigations and for analysis of safety equipment performance (e.g., advanced restraint systems). These data will help provide a better understanding of the circumstances in which crashes and injuries occur and will lead to safer vehicle designs.

§ 563.3 Application.

This part applies to the following vehicles manufactured on or after September 1, 2010, if they are equipped with an event data recorder: passenger cars, multipurpose passenger vehicles, trucks, and buses with a GVWR of 3,855 kg (8,500 pounds) or less and an unloaded vehicle weight of 2,495 kg (5,500 pounds) or less, except for walk-in van-type trucks or vehicles designed to be sold exclusively to the U.S. Postal Service. This part also applies to manufacturers of those vehicles. However, vehicles manufactured before September 1, 2011 that are manufactured in two or more stages or that are altered (within the meaning of 49 CFR 567.7) after having been previously certified to the Federal motor vehicle safety standards in accordance with Part 567 of this chapter need not meet the requirements of this part.

§ 563.4 Incorporation by reference.

The materials listed in this section are incorporated by reference in the corresponding sections as noted. These incorporations by reference were approved by the Director of the Federal Register in accordance with 5 U.S.C. 522(a) and 1 CFR part 51. Copies of these materials may be inspected at the National Highway Traffic Safety Administration, Technical Information Services, 400 Seventh Street, SW., Plaza Level, Room 403, Washington, DC 20590, or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call (202) 741–6030, or go to: *http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html*.

(a) The following materials are available for purchase from the Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096–0001.

(1) Society of Automotive Engineers (SAE) Recommended Practice J211–1 rev. March 1995, ''Instrumentation For Impact Test—Part 1—Electronic Instrumentation'' SAE J211–1 (rev. March 1995) is incorporated by reference in Table 3 of § 563.8;

(2) [Reserved]

(b) [Reserved]

§ 563.5 Definitions.

(a) *Motor vehicle safety standard definitions*. Unless otherwise indicated, all terms that are used in this part and are defined in the Motor Vehicle Safety Standards, part 571 of this subchapter, are used as defined therein.

(b) *Other definitions*.

ABS activity means the anti-lock brake system (ABS) is actively controlling the vehicle's brakes.

Air bag warning lamp status means whether the warning lamp required by FMVSS No. 208 is on or off.

Capture means the process of buffering EDR data in a temporary, volatile storage medium where it is continuously updated at regular time intervals.

Delta-V, lateral means the cumulative change in velocity, as recorded by the EDR of the vehicle, along the lateral axis, starting from crash time zero and ending at 0.25 seconds, and recorded every 0.01 seconds.

Delta-V, longitudinal means the cumulative change in velocity, as recorded by the EDR of the vehicle, along the longitudinal axis, starting from crash time zero and ending at 0.25 seconds, recorded every 0.01 seconds.

Deployment time, frontal air bag means (for both driver and right front passenger) the elapsed time from crash time zero to the deployment command or for multi-staged air bag systems, the deployment command for the first stage.

Disposal means the deployment command of the second (or higher, if present) stage of a frontal air bag for

the purpose of disposing the propellant from the air bag device.

End of event time means the moment at which the cumulative delta-V within a 20 ms time period becomes 0.8 km/h (0.5 mph) or less.

Engine RPM means, for vehicles powered by internal combustion engines, the number of revolutions per minute of the main crankshaft of the vehicle's engine, and for vehicles not powered by internal combustion engines, the number of revolutions per minute of the motor shaft at the point at which it enters the vehicle transmission gearbox.

Engine throttle, percent full means the driver requested acceleration as measured by the throttle position sensor on the accelerator pedal compared to the fully depressed position.

Event means a crash or other physical occurrence that causes the trigger threshold to be met or exceeded.

Event data recorder (EDR) means a device or function in a vehicle that records the vehicle's dynamic, time-series data during the time period just prior to a crash event (e.g., vehicle speed vs. time) or during a crash event (e.g., delta-V vs. time), intended for retrieval after the crash event. For the purposes of this definition, the event data do not include audio and video data.

Frontal air bag means an inflatable restraint system that requires no action by vehicle occupants and is used to meet the applicable frontal crash protection requirements of FMVSS No. 208.

Ignition cycle, crash means the number (count) of power cycles applied to the recording device at the time when the crash event occurred since the first use of the EDR.

Ignition cycle download means the number (count) of power cycles applied to the recording device at the time when the data was downloaded since the first use of the EDR.

Lateral acceleration means the component of the vector acceleration of a point in the vehicle in the y-direction. The lateral acceleration is positive from left to right, from the perspective of the driver when seated in the vehicle facing the direction of forward vehicle travel.

Longitudinal acceleration means the component of the vector acceleration of a point in the vehicle in the x-direction. The longitudinal acceleration is positive in the direction of forward vehicle travel.

Maximum delta-V, lateral means the maximum value of the cumulative change in velocity, as recorded by the EDR, of the vehicle along the lateral axis, starting from crash time zero and ending at 0.3 seconds.

Maximum delta-V, longitudinal means the maximum value of the cumulative change in velocity, as recorded by the EDR, of the vehicle along the longitudinal axis, starting from crash time zero and ending at 0.3 seconds.

Multi-event crash means the occurrence of 2 events, the first and last of which begin not more than 5 seconds apart.

Non-volatile memory means the memory reserved for maintaining recorded EDR data in a semi-permanent fashion. Data recorded in non-volatile memory is retained after a loss of power and can be retrieved with EDR data extraction tools and methods.

Normal acceleration means the component of the vector acceleration of a point in the vehicle in the z-direction. The normal acceleration is positive in a downward direction and is zero when the accelerometer is at rest.

Occupant position classification means the classification indicating that the seating posture of a front outboard occupant (both driver and right front passenger) is determined as being out-of-position.

Occupant size classification means, for right front passenger, the classification of an occupant as an adult and not a child, and for driver, the classification of the driver as not being of small stature.

Pretensioner means a device that is activated by a vehicle's crash sensing system and removes slack from a vehicle safety belt system.

Record means the process of saving captured EDR data into a non-volatile device for subsequent retrieval.

Safety belt status means the feedback from the safety system that is used to determine than an occupant's safety belt (for both driver and right front passenger) is fastened or not fastened.

Seat track position switch, foremost, status means the status of the switch that is installed to detect whether the seat is moved to a forward position.

Service brake, on and off means the status of the device that is installed in or connected to the brake pedal system to detect whether the pedal was pressed. The device can include the brake pedal switch or other driver-operated service brake control.

Side air bag means any inflatable occupant restraint device that is mounted to the seat or side structure of the vehicle interior, and that is designed to deploy in a side impact crash to help mitigate occupant injury and/or ejection.

Side curtain/tube air bag means any inflatable occupant restraint device that is mounted to the side structure of the vehicle interior, and that is designed to deploy in a side impact crash or rollover and to help mitigate occupant injury and/or ejection.

Speed, vehicle indicated means the vehicle speed indicated by a manufacturer-designated subsystem designed to indicate the vehicle's ground travel speed during vehicle operation.

Stability control means any device that is not directly controlled by the operator (e.g., steering or brakes) and is intended to prevent loss of vehicle control by sensing, interpreting, and adjusting a vehicle's driving and handling characteristics, is controlling or assisting the driver in controlling the vehicle.

Steering wheel angle means the angular displacement of the steering wheel measured from the straight-ahead position (position corresponding to zero average steer angle of a pair of steered wheels).

Suppression switch status means the status of the switch indicating whether an air bag suppression system is on or off.

Time from event 1 to 2 means the elapsed time from time zero of the first event to time zero of the second event.

Time, maximum delta-V, longitudinal means the time from crash time zero to the point where the maximum value of the cumulative change in velocity is found, as recorded by the EDR, along the longitudinal axis.

Time to deploy, pretensioner means the elapsed time from crash time zero to the deployment command for the safety belt pretensioner (for both driver and right front passenger).

Time to deploy, side air bag/curtain means the elapsed time from crash time zero to the deployment command for a side air bag or a side curtain/tube air bag (for both driver and right front passenger).

Time to first stage means the elapsed time between time zero and the time when the first stage of a frontal air bag is commanded to fire.

Time to maximum delta-V, lateral means time from crash time zero to the point where the maximum value of the cumulative change in velocity is found, as recorded by the EDR, along the lateral axis.

Time to n^{th} stage means the elapsed time from the crash time zero to the deployment command for the nth stage of a frontal air bag (for both driver and right front passenger).

Time zero means for systems with ''wake-up'' air bag control systems, the time occupant restraint control algorithm is activated; for continuously running algorithms, the first point in the interval where a longitudinal, cumulative delta-V of over 0.8 km/h (0.5 mph) is reached within a 20 ms time period; or for vehicles that record ''delta-V, lateral,'' the first point in the interval where a lateral, cumulative delta-V of over 0.8 km/h (0.5 mph) is reached within a 5 ms time period.

Trigger threshold means a change in vehicle velocity, in the longitudinal direction, that equals or exceeds 8 km/h within a 150 ms interval. For vehicles that record ''delta-V, lateral,'' trigger threshold means a change in vehicle velocity, in either the longitudinal or lateral direction that equals or exceeds 8 km/h within a 150 ms interval.

Vehicle roll angle means the angle between the vehicle y-axis and the ground plane.

Volatile memory means the memory reserved for buffering of captured EDR data. The memory is not capable of retaining data in a semi-permanent fashion. Data captured in a volatile memory is continuously overwritten and is not retained in the event of a power

loss or retrievable with EDR data extraction tools.

X-direction means in the direction of the vehicle X-axis, which is parallel to the vehicle's longitudinal centerline. The X-direction is positive in the direction of forward vehicle travel.

Y-direction means in the direction of the vehicle Y-axis, which is perpendicular to its X-axis and in the same horizontal plane as that axis. The Y-direction is positive from left to right, from the perspective of the driver when seated in the vehicle facing the direction of forward vehicle travel.

Z-direction means in the direction of the vehicle Z-axis, which is perpendicular to the X- and Y-axes. The Z-direction is positive in a downward direction.

§ 563.6 Requirements for vehicles.

Each vehicle equipped with an EDR must meet the requirements specified in § 563.7 for data elements, § 563.8 for data format, § 563.9 for data capture, § 563.10 for crash test performance and survivability, and § 563.11 for information in owner's manual.

§ 563.7 Data elements.

(a) *Data elements required for all vehicles.* Each vehicle equipped with an EDR must record all of the data elements listed in Table I, during the interval/time and at the sample rate specified in that table.

TABLE I.—DATA ELEMENTS REQUIRED FOR ALL VEHICLES EQUIPPED WITH AN EDR

Data element	Recording interval/time [1] (relative to time zero)	Data sample rate samples per second
Delta-V, longitudinal	0 to 250 ms	100
Maximum delta-V, longitudinal	0–300 ms	N.A.
Time, maximum delta-V	0–300 ms	N.A.
Speed, vehicle indicated	−5.0 to 0 sec	2
Engine throttle, % full (or accelerator pedal, % full)	−5.0 to 0 sec	2
Service brake, on/off	−5.0 to 0 sec	2
Ignition cycle, crash	−1.0 sec	N.A.
Ignition cycle, download	At time of download	N.A.
Safety belt status, driver	−1.0 sec	N.A.
Frontal air bag warning lamp, on/off	−1.0 sec	N.A.
Frontal air bag deployment, time to deploy, in the case of a single stage air bag, or time to first stage deployment, in the case of a multi-stage air bag, driver.	Event	N.A.
Frontal air bag deployment, time to deploy, in the case of a single stage air bag, or time to first stage deployment, in the case of a multi-stage air bag, right front passenger.	Event	N.A.
Multi-event, number of events (1,2)	Event	N.A.
Time from event 1 to 2	As needed	N.A.
Complete file recorded (yes, no)	Following other data	N.A.

[1] Pre-crash data and crash data are asynchronous. The sample time accuracy requirement for pre-crash time is −0.1 to 1.0 sec (e.g., T = −1 would need to occur between −1.1 and 0 seconds.)

(b) *Data elements required for vehicles under specified conditions.* Each vehicle equipped with an EDR must record each of the data elements listed in column 1 of Table II for which the vehicle meets the condition specified in column 2 of that table, during the interval/time and at the sample rate specified in that table.

TABLE II.—DATA ELEMENTS REQUIRED FOR VEHICLES UNDER SPECIFIED CONDITIONS

Data element name	Condition for requirement	Recording interval/time [1] (relative to time zero)	Data sample rate (per second)
Lateral acceleration	If recorded [2]	0–250 ms	500
Longitudinal acceleration	If recorded	0–250 ms	500
Normal acceleration	If recorded	0–250 ms	500
Delta-V, lateral	If recorded	0–250 ms	100
Maximum delta-V, lateral	If recorded	0–300 ms	N.A.
Time maximum delta-V, lateral	If recorded	0–300 ms	N.A.
Time for maximum delta-V, resultant	If recorded	0–300 ms	N.A.
Engine rpm	If recorded	−5.0 to 0 sec	2